Calvert Cliffs Nuclear Power Plant Unit 3

Combined License Application

Part 7: Departures and Exemption Requests

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This COLA Part is completely Site Specific

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1.0 DEPARTURES AND EXEMPTION REQUESTS

1.1 DEPARTURES

This Departure Report includes deviations in the CCNPP Unit 3 COL application FSAR from the information in the U.S. EPR FSAR, pursuant to 10 CFR Part 52. The U.S. EPR Design Certification Application is currently under review with the NRC. However, for the purposes of evaluating these deviations from the information in the U.S. EPR FSAR, the guidance provided in Regulatory Guide 1.206, Section C.IV.3.3, has been utilized.

The following Departures are described and evaluated in detail in this report:

1. Maximum Differential Settlement (across the basemat)
2. Maximum Annual Average Atmospheric Dispersion Factor (limiting sector),
3. Accident Atmospheric Dispersion Factor (0-2 hour, Low Population Zone)
4. Toxic Gas Detection and Isolation
5. Shear Wave Velocity
6. Coefficient of Static Friction
7. Maximum Non-Coincident Wet Bulb Temperature Value at 0% Exceedance (85°F)
8. In-Structure Response Spectra
9. Generic Technical Specifications and Bases - Setpoint Control Program

1.1.1 MAXIMUM DIFFERENTIAL SETTLEMENT (ACROSS THE BASEMAT)

Affected U.S. EPR FSAR Sections: Tier 1 Table 5.0-1, Tier 2 Table 2.1-1, Tier 2 Section 2.5.4.10.2

Summary of Departure:

The U.S. EPR FSAR identifies a maximum differential settlement of 1/2 inch in 50 feet (i.e., 1/1200) in any direction across the basemat. The estimated settlement values for the Nuclear Island common basemat, Emergency Generating Building foundations, and Essential Service Water System Cooling Tower foundations exceed the U.S. EPR FSAR value.

Extent/Scope of Departure:

This Departure is identified in CCNPP Unit 3 FSAR Table 2.0-1 and Section 2.5.4.10.2.

Departure Justification:

The estimated site-specific values for settlement of the CCNPP Unit 3 Nuclear Island common basemat foundation are in the range of 1/600 (1 inch in 50 feet) to 1/1200 (1/2 inch in 50 feet) as stated in FSAR Section 2.5.4.10.2.

As described in FSAR Section 3.8.5.5.1, to account for the Calvert Cliffs site-specific expected differential settlement values, an evaluation of differential settlements up to 1/600 (1 inch in 50 feet) was performed. The evaluation consisted of a static finite element analysis of the foundation structures which considered the effects of the higher expected displacement (tilt) on the foundation bearing pressures and basemat stress due to structural eccentricities resulting from a uniform rotation of the foundation mat along the axis of the nuclear island

common basemat. The evaluation assumed no changes in the soil stiffness or increased flexure due to differential settlement consistent with the design analysis for the standard U.S. EPR design. The evaluation considered Soil Case SC15, from the U.S. EPR FSAR standard design, which represented the softest soil condition used in the U.S. EPR standard plant design and exhibits the largest differential displacements of the basemat. Results from the evaluation indicate there is negligible difference in both the soil bearing pressures and the stresses in the concrete basemat structure when the Nuclear Island is subjected to an initial settlement of 1/600 (1 inch in 50 feet) as compared to the U.S. EPR standard plant analysis results that were based on an initial settlement of 1/1200 (1/2 inch in 50 feet). Therefore, the site specific departure in differential settlement values is structurally acceptable.

The estimated site-specific differential settlement for the Emergency Power Generating Buildings and Essential Service Water System Cooling Towers (based on a fully flexible basemat) are 1/1166 and 1/845 (approximately ½ and ¾ inch in 50 ft), respectively, as stated in FSAR Section 2.5.4.10.2.

As described in Sections FSAR 3.8.5.5.2 and 3.8.5.5.3, finite element analyses were performed for the Emergency Power Generating Buildings and Essential Service Water System Cooling Towers using soil springs representing the CCNPP Unit 3 site. For each structure, the differential settlement within the confines of the building periphery is shown to be substantially less than the 1/1200 (1/2 inch in 50 feet) requirement of the U.S. EPR FSAR.

The variation of the finite element analysis differential settlement with the estimated differential settlements of Section 2.5.4.10.2 is attributed to the conventional geotechnical treatment of the foundation as a flexible plate, a condition much more conservative than the actual heavily stiffened (by deep reinforced concrete walls) 6'-0" thick reinforced concrete Emergency Power Generating Building and Essential Service Water System Cooling Tower basemats.

Finite element analyses were also performed to evaluate the effects of overall Emergency Power Generating Building and Essential Service Water System Cooling Tower tilts of L/550 and L/600, respectively, where L is the least basemat dimension. For these analyses:

- Spring stiffnesses are adjusted to achieve a tilt of L/550,
- The elliptical distribution of soil springs is maintained,
- Soil spring stiffnesses along the basemat centerline (perpendicular to the direction of tilt) are retained, and
- Adjustment is made to all other springs as a function of the distance from the basemat centerline to the edges.

Bending moments from these finite element analyses confirm that an uncracked condition of the Emergency Power Generating Building and Essential Service Water System Cooling Tower basemats is maintained.

Departure Evaluation:

This Departure, associated with the maximum differential settlement of the Nuclear Island common basemat, the Emergency Power Generating Building foundations, and Essential Service Water System Cooling Tower foundations, has been evaluated and determined to not adversely affect the safety function of these structures. Accordingly, the Departure does not:

1. Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the plant-specific FSAR;

2. Result in more than a minimal increase in the likelihood of occurrence of a malfunction of a structure, system, or component (SSC) important to safety and previously evaluated in the plant-specific FSAR;

3. Result in more than a minimal increase in the consequences of an accident previously evaluated in the plant-specific FSAR;

4. Result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the plant-specific FSAR;

5. Create a possibility for an accident of a different type than any evaluated previously in the plant-specific FSAR;

6. Create a possibility for a malfunction of an SSC important to safety with a different result than any evaluated previously in the plant-specific FSAR;

7. Result in a design basis limit for a fission product barrier as described in the plant specific FSAR being exceeded or altered;

8. Result in a departure from a method of evaluation described in the plant-specific; or

9. FSAR used in establishing the design bases or in the safety analyses.

This Departure does not affect resolution of a severe accident issue identified in the plant-specific FSAR.

Therefore, this Departure has no safety significance.

1.1.2 MAXIMUM ANNUAL AVERAGE ATMOSPHERIC DISPERSION FACTOR (LIMITING SECTOR)

Affected U.S. EPR FSAR Sections: Tier 2 Table 2.1-1 and Section 2.3.5.

Summary of Departure:

The U.S. EPR FSAR identifies the Maximum Annual Average Atmospheric Dispersion Factor (limiting sector) of $\leq$ 4.973E-6 sec/m^3. The corresponding CCNPP Unit 3 value is 5.039E-06 sec/m^3, as discussed in CCNPP Unit 3 FSAR Section 2.3.5, CCNPP Unit 3 Normal Effluent Annual Average, Undecayed, Undepleted χ/Q Values for Mixed Mode Release Using 242,458 cfm Flow Rate for Grid Receptors, NE Sector at 0.5 mile.

Scope/Extent of Departure:

This Departure is identified in CCNPP Unit 3 FSAR Table 2.0-1 and Section 2.3.5.

Departure Justification:

A review of CCNPP Unit 3 Environmental Report, Table 5.4-6, "Distance to Nearest Gaseous Dose Receptors," indicates that the NE sector of the Exclusion Area Boundary (EAB) (0.5 mile radius centered on Reactor Building) intersects with the Site Area Boundary (0.28 mile) at the shoreline of Chesapeake Bay. The Maximum Annual Average Atmospheric Dispersion Factor (χ/Q) value is computed at 0.5 miles which is a located approximately 0.22 mile off shore in the Chesapeake Bay. As discussed in CCNPP Unit 3 FSAR Section 2.3.5, all other sectors' annual

average χ/Q value at 0.5 miles are bounded by the Maximum Annual Average χ/Q value provided in U.S. EPR FSAR Table 2.1-1.

Although the Maximum Annual Average χ/Q value for CCNPP Unit 3 exceeds the χ/Q limiting value specified in Table 2.1-1 of the U.S. EPR FSAR, operation of CCNPP Unit 3 is justified for the following reasons:

- There are no persons currently living within the EAB or on its boundary in the NE sector (i.e., persons will not be living within the sector of the Maximum Annual Average χ/Q value).
- The boundary of the EAB in the NE sector lies on Chesapeake Bay, therefore the probability of anyone living on a watercraft 0.22 mile off shore for an extended period of time is extremely low.
- The CCNPP Unit 3 will have control over the point in the NE sector at which EAB and the Site Boundary intersect.
- All other sectors' maximum annual average χ/Q value are within the limiting value specified in Table 2.1-1 of the U.S. EPR FSAR.

Therefore, dose limits of 10 CFR 50 Appendix I for the maximally exposed individual will not be exceeded.

Departure Evaluation:

This Departure, associated with the Maximum Annual Average Atmospheric Dispersion Factor (χ/Q), does not result in dose limits of 10 CFR 50 Appendix I for the maximally exposed individual being exceeded. Therefore this Departure does not:

1. Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the plant-specific FSAR;
2. Result in more than a minimal increase in the likelihood of occurrence of malfunction of a structure, system, or component (SSC) important to safety and previously evaluated in the plant-specific FSAR;
3. Result in more than a minimal increase in the consequences of an accident previously evaluated in the plant-specific FSAR;
4. Result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the plant-specific FSAR;
5. Create a possibility for an accident of a different type than any evaluated previously in the plant-specific FSAR;
6. Create a possibility for a malfunction of an SSC important to safety with a different result than any evaluated previously in the plant-specific FSAR;
7. Result in a design basis limit for a fission product barrier as described in the plant-specific FSAR being exceeded or altered; or
8. Result in a departure from a method of evaluation described in the plant-specific FSAR used in establishing the design bases or in the safety analyses.

This Departure does not affect resolution of a severe accident issue identified in the plant-specific FSAR.

Therefore, this Departure has no safety significance.

1.1.3 ACCIDENT ATMOSPHERIC DISPERSION FACTOR (0-2 HOUR, LOW POPULATION ZONE)

Affected U.S. EPR FSAR Sections: Tier 1 Table 5.0-1, Tier 2 Table 2.1-1, Section 2.3.4, and Section 15.0.3

Summary of Departure:

The U.S. EPR FSAR identifies the 0-2 hour Accident Atmospheric Dispersion Factor (Low Population Zone) of $\leq$ 1.75E-4 sec/m^3. The corresponding CCNPP Unit 3 value is 2.151E-04 sec/m^3, as discussed in CCNPP Unit 3 FSAR Section 2.3.4, Site-Specific EAB/LPZ Accident χ/Q Values for Ground Level Releases.

Scope/Extent of Departure:

This Departure is identified in CCNPP Unit 3 FSAR Table 2.0-1, Section 2.3.4 and Section 15.0.3.

Departure Justification:

The site specific Accident Atmospheric Dispersion Factors, including the Low Population Zone 0-2 hour at 1.5 miles χ/Q of 2.151E-04 sec/m^3, were used in the calculation of site-specific doses resulting from the design basis accident scenarios specified in U.S. EPR FSAR Section 15.0.3. In each case, the resulting Low Population Zone doses were determined to be below the regulatory limits.

Departure Evaluation:

This Departure, associated with the 0-2 hour Accident Atmospheric Dispersion Factor (Low Population Zone, 1.5 miles), does not result in Low Population Zone doses that exceed regulatory limits. Therefore this Departure does not:

1. Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the plant-specific FSAR;

2. Result in more than a minimal increase in the likelihood of occurrence of malfunction of a structure, system, or component (SSC) important to safety and previously evaluated in the plant-specific FSAR;

3. Result in more than a minimal increase in the consequences of an accident previously evaluated in the plant-specific FSAR;

4. Result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the plant-specific FSAR;

5. Create a possibility for an accident of a different type than any evaluated previously in the plant-specific FSAR;

6. Create a possibility for a malfunction of an SSC important to safety with a different result than any evaluated previously in the plant-specific FSAR;

7. Result in a design basis limit for a fission product barrier as described in the plant-specific FSAR being exceeded or altered; or

8. Result in a departure from a method of evaluation described in the plant-specific FSAR used in establishing the design bases or in the safety analyses.

This Departure does not affect resolution of a severe accident issue identified in the plant-specific FSAR.

Therefore, this Departure has no safety significance.

1.1.4 TOXIC GAS DETECTION AND ISOLATION

Affected U.S. EPR FSAR Sections: Tier 1 Section 2.6.1, Tier 2 Section 3.11, Tier 2 Section 6.4, Tier 2 Section 9.4.1, Tier 2 Section 14.2.12.8.10, Tier 2 Chapter 16

Summary of Departure:

The U.S. EPR FSAR Tier 1 Section 2.6.1 requires that the main control room air conditioning system maintain habitability of the control room envelope and ambient temperature conditions inside the control room envelope during toxic gas contamination events. As a result, the U.S. EPR design provides a toxic gas alarm signal with automatically closing air intake dampers. For CCNPP Unit 3, the toxic gas alarm signal is not required and protection from toxic gas contamination events is not part of the site-specific design basis.

Scope/Extent of Departure:

This Departure is identified in CCNPP Unit 3 FSAR Sections 3.11, 6.4, 9.4.1 and 14.2.12.

Departure Justification:

An evaluation of the site-specific toxic chemical hazards in CCNPP Unit 3 FSAR Section 2.2.3 did not identify any credible toxic chemical accidents that exceeded the limits established in Regulatory Guide 1.78. No specific provisions are required to protect the operators from an event involving a release of a toxic gas. Therefore, detection of toxic gases and subsequent isolation of the Control Room Envelope (CRE) is not required and is not part of the CCNPP Unit 3 site-specific design basis.

Departure Evaluation:

This Departure, associated with the detection of toxic gas and automatic isolation of the Control Room Envelope, has been evaluated and determined to not adversely affect the safety function.

Accordingly, the Departure does not:

1. Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the plant-specific FSAR;

2. Result in more than a minimal increase in the likelihood of occurrence of a malfunction of a structure, system, or component (SSC) important to safety and previously evaluated in the plant-specific FSAR;

3. Result in more than a minimal increase in the consequences of an accident previously evaluated in the plant-specific FSAR;

4. Result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the plant-specific FSAR;

5. Create a possibility for an accident of a different type than any evaluated previously in the plant-specific FSAR;

6. Create a possibility for a malfunction of an SSC important to safety with a different result than any evaluated previously in the plant-specific FSAR;

7. Result in a design basis limit for a fission product barrier as described in the plant-specific FSAR being exceeded or altered; or

8. Result in a departure from a method of evaluation described in the plant-specific FSAR used in establishing the design bases or in the safety analyses.

This Departure does not affect resolution of a severe accident issue identified in the plant specific FSAR.

Therefore, this Departure has no safety significance.

1.1.5 Shear Wave Velocity

Affected U.S. EPR FSAR Sections: Tier 1 Table 5.0-1, Tier 2 Table 2.1-1

Summary of Departure:

The U.S. EPR FSAR identifies a minimum shear wave velocity (low strain best estimate average value at bottom of basemat) of 1,000 feet per second (fps) in Tier 1, Table 5.0 1. This 1,000 fps requirement, without identifying specific structures, is repeated in Table 2.1-1 of Tier 2. Section 2.5.2.6, *Ground Motion Response Spectrum*, of the U.S. EPR FSAR states that the applicant will confirm that the low-strain, best-estimate, value of shear wave velocity at the bottom of the foundation basemat of the Nuclear Island (NI) Common Basemat Structures is 1,000 fps, or greater. U.S. EPR FSAR Section 2.5.4.3, *Foundation Interfaces*, specifies the following requirement with respect to shear wave velocity:

> (4) adequate dynamic properties (i.e., shear wave velocity and strain-dependent modulus-reduction and hysteretic damping properties) to support the Seismic Category I structures of the U.S. EPR under earthquake loading.

Calvert Cliffs 3 Nuclear Project, LLC and UniStar Nuclear Operating Services, LLC, have elected to consider a shear wave velocity of less than 1,000 fps under any Seismic Category I facility described in the U.S. EPR FSAR as a departure. The best estimate shear wave velocity in Fill Layer 2, the fill from 6 feet below grade (the basemat of the Emergency Power Generating Building (EPGBs)) to 22 feet below grade is 900 fps. The best estimate shear wave velocity beneath the Essential Service Water Buildings (ESWBs) is 1080 fps. Calvert Cliffs 3 Nuclear Project, LLC and UniStar Nuclear Operating Services, LLC, are establishing acceptance criteria for shear wave velocity testing that are approximately one standard deviation less than the best estimate values, but greater than the lower bound values used by the site-specific Soil-Structure Interaction (SSI) analysis. Establishing acceptance criteria greater than the lower bound but less than the best estimate value will ensure that the shear wave velocity testing demonstrates that the backfill has been properly graded and installed, while minimizing the potential for a false failure of the shear wave velocity due to small inconsistencies in the field measured data resulting in an average shear wave velocity that is within the bounds of the analysis, but less than the best estimate value from laboratory testing. Calvert Cliffs 3 Nuclear Project, LLC and UniStar Nuclear Operating Services, LLC, have established 630 fps and 720 fps

as the acceptance criteria for the EPGBs and ESWBs respectively. Since these values are less than 1,000 fps, this constitutes a departure.

Scope/Extent of Departure:

This Departure is identified in CCNPP Unit 3 FSAR Table 2.0-1 and Section 2.5.4.2.5.8, and in COLA Part 10, ITAAC.

Departure Justification:

The fill selected for CCNPP Unit 3 is competent material. It has a moist unit weight of 145 lb/ft^3 and an angle of internal friction of more than 40°. Both of these values exceed the U.S. EPR established criteria in Section 2.5.4.2, *Properties of Subsurface Materials*.

The U.S. EPR FSAR Tier 1 also states in Section 5.0:

> In the case of seismic design parameters, deviations from the defined conditions may be justified by site-specific soil-structure interaction analyses. The results may be used to confirm the seismic design adequacy of the certified design using approved methods and acceptance criteria.

The site-specific Soil-Structure Interaction (SSI) analysis performed for FSAR Section 3.7 establishes a range of acceptable shear wave velocities beneath the ESWBs and EPGBs. The lowest acceptable shear wave velocity is a lower bound and the highest is an upper bound. This analysis demonstrates that the EPGBs withstand the safe shutdown earthquake (SSE) for that range of shear wave velocities.

Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) testing will be performed during construction to confirm that the shear wave velocity of the installed and compacted fill exceeds the lower bound shear wave velocity used in the FSAR Section 3.7 analysis. This ITAAC testing demonstrates acceptability of this aspect of the building seismic analysis.

Departure Evaluation:

This Departure, associated with the shear wave velocity for the fill beneath the Emergency Power Generating Buildings has been evaluated and determined to not adversely affect the safety function of these structures. Accordingly, this Departure does not:

1. Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the plant-specific FSAR;
2. Result in more than a minimal increase in the likelihood of occurrence of a malfunction of a structure, system, or component (SSC) important to safety and previously evaluated in the plant-specific FSAR;
3. Result in more than a minimal increase in the consequences of an accident previously evaluated in the plant-specific FSAR;
4. Result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the plant-specific FSAR;
5. Create a possibility for an accident of a different type than any evaluated previously in the plant-specific FSAR;
6. Create a possibility for a malfunction of an SSC important to safety with a different result than any evaluated previously in the plant-specific FSAR;

7. Result in a design basis limit for a fission product barrier as described in the plant-specific FSAR being exceeded or altered; or

8. Result in a departure from a method of evaluation described in the plant-specific FSAR used in establishing the design bases or in the safety analyses.

This Departure does not affect resolution of a severe accident issue identified in the plant-specific FSAR.

Therefore, this Departure has no safety significance.

1.1.6 Coefficient of Static Friction

Affected U.S. EPR FSAR Sections: Tier 2 Table 2.1-1, Tier 2 Sections 2.5.4.2, 3.8.5.4.2, and 3.8.5.6.1

Summary of Departure:

The U.S. EPR FSAR identifies a minimum coefficient of static friction of 0.7 at the soil basemat interface. The geotechnical site investigation for CCNPP Unit 3 indicates coefficients of static friction between 0.35 and 0.45 for the underlying soil layers including structural fill, as discussed in FSAR Section 2.5.4. Static friction coefficients for various sliding interfaces under the Nuclear Island common basemat, the Emergency Power Generating Building foundations, and the Essential Service Water Building foundations are reported in FSAR Section 3.8.5. All the aforementioned coefficients of static friction are less than the U.S. EPR FSAR value of 0.7.

Scope/Extent of Departure:

This Departure is identified in Part 2 FSAR, Section 3.8.5.5.

Departure Justification:

As described in FSAR Section 3.8.5.5, site-specific sliding stability evaluations are performed for the Nuclear Island Common Basemat Structures, the Emergency Power Generating Buildings (EPGBs), and the Essential Service Water Buildings (ESWBs) under site SSE loading. The governing factors of safety against sliding exceed the minimum allowable value of 1.1, as specified by NUREG 0800, Standard Review Plan 3.8.5, Structural Acceptance Criteria II.5. The factors of safety are reported in FSAR Section 3.8.5. Passive soil pressure is not utilized in these evaluations.

Therefore, the Nuclear Island Common Basemat Structures, the Emergency Power Generating Buildings, and the Essential Service Water Buildings are stable, despite the lower coefficients of static friction.

Departure Evaluation:

This Departure, associated with static coefficient of friction used for the Nuclear Island Common Basemat Structures foundations, the Emergency Power Generating Building foundations, and the Essential Service Water Building foundations, has been evaluated and determined to not affect the safety function of these structures. Accordingly, this Departure does not:

1. Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the plant-specific FSAR;

2. Result in more than a minimal increase in the likelihood of occurrence of malfunction of a structure, system, or component (SSC) important to safety and previously evaluated in the plant-specific FSAR;

3. Result in more than a minimal increase in the consequences of an accident previously evaluated in the plant-specific FSAR.

4. Result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the plant-specific FSAR;

5. Create a possibility for an accident of a different type than any evaluated previously in the plant-specific FSAR;

6. Create a possibility for a malfunction of an SSC important to safety with a different result than any evaluated previously in the plant specific FSAR;

7. Result in a design basis limit for a fission product barrier as described in the plant-specific FSAR being exceeded or altered; or

8. Result in a departure from a method of evaluation described in the plant-specific FSAR used in establishing the design bases or in the safety analyses.

This Departure does not affect resolution of a severe accident issue identified in the plant-specific FSAR.

Therefore, this Departure has no safety significance.

1.1.7 Maximum Non-Coincident Wet Bulb Temperature Value at 0% Exceedance (85°)

Affected U.S. EPR FSAR Sections: Tier 2 Table 2.1-1, Section 2.3.1, and Section 9.2.5

Summary of Departure

The U.S. EPR FSAR Table 2.1-1 specifies a 0% exceedance non-coincident maximum wet bulb air temperature value of 81°F (27°C). The corresponding CCNPP Unit 3 value is 81°F (27°C).as shown in the CCNPP Unit 3 FSAR Table 2.0-1. Therefore, the U.S. EPR FSAR 0% exceedance non-coincident maximum wet bulb air temperature listed in Table 2.1-1 does not bound the corresponding value for CCNPP Unit 3.

Scope/Extent of Departure

This Departure is identified in the CCNPP Unit 3, FSAR Table 2.0-1 and Section 2.3.1.2.2.13. The acceptability of the 0% exceedance non-coincident wet bulb temperature design value is included in FSAR Section 9.2.1 .1.

Department Justification

The CCNPP Unit 3 site-specific wet and dry bulb temperatures were determined using 30 years of climatology data (1976-2006) from Patuxent River Naval Air Station, just south of the site. The data analysis yielded a 0% exceedance wet bulb temperature value of 85°F (29°C) with a coincident dry bulb temperature value of 99°F (37°C). The 0% exceedance criterion means that

the wet bulb temperature does not exceed the 0% exceedance value for more than two consecutive data occurrences. (The Patuxent River data was recorded hourly).

This Departure is justified because it is derived from local climatology data and because the cooling tower performance at its design point is analyzed for the worst case, time-dependent meteorological conditions noted in Section 9.2.1.1 (including the highest recorded wet bulb temperature of 85°F (29°C)) and the similarly time-dependent DBA heat rejection. The cooling tower performance satisfies the supply water temperature requirement under the most limiting conditions.

Departure Evaluation

The cooling tower performance is analyzed considering the worst case combination of input parameters, which includes the time-dependent meteorological conditions noted in Section 9.2.1.1 and the similarly time-dependent DBA heat rejection. The tower design point is based on a wet bulb temperature of 81°F (27°C) at a specific heat load yielding a specific water temperature. A 1°F wet bulb temperature increase was added for conservatism. The wet bulb temperature is the controlling factor for establishing the tower basin water temperature because of the more limited ability of the ambient air to absorb heat energy in moving through the tower. This design point satisfies the supply water temperature requirement under limiting conditions as described in Section 9.2.1.1. Refer to Section 2.3.1.2.2. 13 and the tabular comparison to U.S. EPR FSAR Table 2.1-4 for the worst case 24 hour meteorological period for ESWS cooling. Applying these factors to CCNPP Unit 3, the resulting maximum UHS tower basin water temperature is less than the 95°F (35°C) worst-case design basis for the Essential Service Water System (ESWS) and the Component Cooling Water System (CCWS) heat exchangers. Based on the analysis of the UHS System with local meteorological data, it has been determined that the maximum ESWS supply temperature is less than 95°F (35°C) (consistent with U.S EPR FSAR Section 9.2.5).

Alternatively, the higher difference between wet and coincident dry bulb temperatures indicates lower humidity and a resultant higher evaporation rate, thus making this the controlling factor for determining the makeup water demand and the required tower basin water volume. The maximum evaporative loss from a UHS cooling tower after the 72 hour period following a design basis accident is 225 gpm (852 lpm). Accordingly, this Departure does not:

1. Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the plant-specific FSAR;

2. Result in more than a minimal increase in the likelihood of occurrence of malfunction of a structure, system, or component (SSG) important to safety and previously evaluated in the plant-specific FSAR;

3. Result in more than a minimal increase in the consequences of an accident previously evaluated in the plant-specific FSAR;

4. Result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the plant-specific FSAR;

5. Create a possibility for an accident of a different type than any evaluated previously in the plant-specific FSAR;

6. Create a possibility for a malfunction of an SSC important to safety with a different result than any evaluated previously in the plant-specific FSAR;

7. Result in a design basis limit for a fission product barrier as described in the plant-specific FSAR being exceeded or altered; or

8. Result in a departure from a method of evaluation described in the plantspecific FSAR used in establishing the design bases or in the safety analyses.

This Departure does not affect resolution of a severe accident issue identified in the plant-specific FSAR.

Therefore, this Departure has no safety significance.

1.1.8 In-Structure Response Spectra (ISRS)

Affected U.S. EPR FSAR Sections: Tier 2 Section 3.7.2

Summary of Departure:

The U.S. EPR FSAR identifies ISRS at representative locations of the EPGB, and ESWB. The corresponding CCNPP Unit 3 ISRS are identified in the CCNPP3 FSAR Section 3.7.2.5 and represent a departure from the U.S. EPR FSAR.

Scope/Extent of Departure:

This Departure is identified in Part 2 FSAR, Section 3.7.2.5.2.

Departure Justification:

This departure is justified using the U.S. EPR FSAR Section 2.5.2.6 seismic reconciliation guidelines. The CCNPP Unit3 site-specific in-structure response spectra (ISRS) for the EPGB and ESWB are developed from the CCNPP Unit 3 Site SSE spectrum and soil profiles and are compared with the U.S. EPR design certification ISRS.

For critical locations in EPGB and ESWB at frequencies greater than approximately 0.3 Hz, the CCNPP Unit 3 site-specific ISRS do not exceed the ISRS for the U.S. EPR.

For frequencies less than approximately 0.3 Hz where the site-specific ISRS exceed the design ISRS by more than 10 %, evaluations of safety-related structures, systems, and components (SSC) were performed in accordance with Step 9 of U.S. EPR FSAR 2.5.2.6. These evaluations are discussed in Sections 3.7.2.5.2 and 3.10 and confirm the SSCs will perform their safety related functions following an SSE.

Departure Evaluation:

This Departure, associated with ISRS, has been evaluated in accordance with the U.S. EPR FSAR Section 2.5.2.6 seismic reconciliation guidelines and determined to not affect the safety function of the safety-related SSCs of the U.S. EPR at the building locations where CCNPP Unit 3 site-specific ISRS exceed the ISRS for the U.S. EPR design certification by more than 10%. Accordingly, this Departure does not:

1. Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the plant-specific FSAR;

2. Result in more than a minimal increase in the likelihood of occurrence of malfunction of a structure, system, or component (SSC) important to safety and previously evaluated in the plant-specific FSAR;

3. Result in more than a minimal increase in the consequences of an accident previously Result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the plant-specific FSAR;

4. Create a possibility for an accident of a different type than any evaluated previously in the plant-specific FSAR;

5. Create a possibility for a malfunction of an SSC important to safety with a different result than any evaluated previously in the plant-specific FSAR;

6. Result in a design basis limit for a fission product barrier as described in the plant-specific FSAR being exceeded or altered; or

7. Result in a departure from a method of evaluation described in the plant-specific FSAR used in establishing the design bases or in the safety analyses.

This Departure does not affect resolution of a severe accident issue identified in the plant-specific FSAR.

Therefore, this Departure has no safety significance.

1.1.9 GENERIC TECHNICAL SPECIFICATIONS AND BASES - SETPOINT CONTROL PROGRAM

Affected U.S. EPR FSAR Sections: Tier 2, Section 16 - Technical Specifications (TS) 3.3.1 and 5.5, and Bases 3.3.1

Summary of Departure:

A Setpoint Control Program is adopted in the CCNPP Unit 3 Technical Specifications (TS). TS 3.3.1 is revised to delete the associated Reviewer's Notes and bracketed information. Applicable Surveillance Requirements and footnotes are revised to reference the Setpoint Control Program. Numerical setpoints are removed and replaced with a reference to the Setpoint Control Program. TS 5.5 is revised to add a Setpoint Control Program description to the Administrative Controls - Programs and Manuals Section (5.5). The Setpoint Control Program description references the NRC approved setpoint methodology documents that shall be used for the development of required numerical setpoints. The TS Bases 3.3.1 are revised to incorporate additional background information and clarify the applicability of the program to specific functions.

Scope/Extent of Departure:

This Departure is identified in the Generic Changes section of Part 4 of the CCNPP Unit 3 COL Application, Generic Change Items 2, 10 and 13.

Departure Justification:

Certain plant specific setpoints cannot be determined until after the selection of instrumentation and require as-built system design information, which may not occur until after the approval of the COL application is granted. SECY-08-0142, *"Change in Staff Position Concerning Information in Plant-Specific Technical Specifications that Combined License Applicants Must Provide to Support Issuance of Combined Licenses,"* states that *"the plant-specific Technical Specifications issued with a combined license must be complete, implementable, and provide a basis for the Commission to conclude that the plant will operate in accordance with the*

relevant requirements." An option to satisfy this requirement is to relocate numerical values out of the TS and replace them with an administrative program that references NRC approved methodologies for determining these values. The methodologies cited in the Setpoint Control Program for determining these numerical values have been submitted to NRC. Referencing these NRC approved methodologies in the TS provide reasonable assurance that the facility will be operated in conformity with the license, the provisions of the Act, and the Commission's rules and regulations.

Departure Evaluation:

This Departure, the inclusion of a Setpoint Control Program and the associated changes in the TS and Bases, provides adequate assurance the required Limiting Trip Setpoint (LTSP), Nominal Trip Setpoint (NTSP), Allowable Value (AV), Performance Testing Acceptance Criteria (PTAC), As-Left Tolerance (ALT), and Permissive values are developed and maintained such that safety functions will actuate at the point assumed in the applicable safety analysis. Accordingly, the Departure does not:

1. Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the plant-specific FSAR;

2. Result in more than a minimal increase in the likelihood of occurrence of a malfunction of a structure, system, or component (SSC) important to safety and previously evaluated in the plant-specific FSAR;

3. Result in more than a minimal increase in the consequences of an accident previously evaluated in the plant-specific FSAR;

4. Result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the plant-specific FSAR;

5. Create a possibility for an accident of a different type than any evaluated previously in the plant-specific FSAR;

6. Create a possibility for a malfunction of an SSC important to safety with a different result than any evaluated previously in the plant-specific FSAR;

7. Result in a design basis limit for a fission product barrier as described in the plant specific FSAR being exceeded or altered; or

8. Result in a departure from a method of evaluation described in the plantspecific FSAR used in establishing the design bases or in the safety analyses.

This Departure does not affect resolution of a severe accident issue identified in the plant specific FSAR.

Therefore, this Departure has no safety significance.

This change is both a Departure and an Exemption (as discussed in COLA Part 7, Section 1.2) requiring NRC approval.

1.2 EXEMPTION REQUESTS

These exemption requests have been developed assuming approval and issuance of a design certification for the U.S. EPR and are based on the current version of the U.S. EPR FSAR.

Calvert Cliffs 3 Nuclear Project and UniStar Nuclear Operating Services request the following exemptions related to:

1. Maximum Differential Settlement (across the basemat),
2. Accident Atmospheric Dispersion Factor (0-2 hour, Low Population Zone),
3. Use of M5™ Advanced Zirconium Alloy Fuel Rod Cladding, and
4. Toxic Gas Detection and Isolation.
5. Shear Wave Velocity
6. Generic Technical Specifications and Bases - Setpoint Control Program

The exemption request associated with Use of M5™ Advanced Zirconium Alloy Fuel Rod Cladding, is the same as that previously requested by AREVA in support of the U.S. EPR Design Certification Application.

Discussion and justification for each of the above exemption requests are provided in the following pages.

1.2.1 MAXIMUM DIFFERENTIAL SETTLEMENT (ACROSS THE BASEMAT)

Applicable Regulation: 10 CFR Part 52

The U.S. EPR FSAR Tier 1 Table 5.0-1, Tier 2 Table 2.1-1, and Tier 2 Section 2.5.4.10.2 identify a maximum differential settlement of ½ inch in 50 feet (i.e., 1/1200) in any direction across the basemat. The estimated settlement values for the Nuclear Island common basemat, Emergency Generating Building foundations, and Essential Service Water System Cooling Tower foundations exceed the U.S. EPR FSAR value.

Pursuant to 10 CFR 52.7 and 10 CFR 52.93, Calvert Cliffs 3 Nuclear Project, LLC, and UniStar Nuclear Operating Services, LLC, request an exemption from compliance with the U.S. EPR FSAR Tier 1 and 2 requirements associated with the maximum differential settlement.

Discussion:

The estimated site-specific values for settlement of the CCNPP Unit 3 Nuclear Island common basemat foundation are in the range of 1/600 (1 inch in 50 feet) to 1/1200 (½ inch in 50 feet) as stated in FSAR Section 2.5.4.10.2.

As described in FSAR Section 3.8.5.5.1, an evaluation of differential settlements up to 1/600 (1 inch in 50 feet) was performed. The evaluation consisted of a static finite element analysis of the foundation structures which considered the effects of the higher expected displacement (tilt) on the foundation bearing pressures and basemat stress due to structural eccentricities resulting from a uniform rotation of the foundation mat along the axis of the nuclear island common basemat. The evaluation assumed no changes in the soil stiffness or increased flexure due to differential settlement consistent with the design analysis for the standard U.S. EPR design. The evaluation considered Soil Case SC15, from the U.S. EPR FSAR standard design,

which represented the softest soil condition used in the U.S. EPR standard plant design and exhibits the largest differential displacements of the basemat. Results from the evaluation indicate there is negligible difference in both the soil bearing pressures and the stresses in the concrete basemat structure when the Nuclear Island is subjected to an initial settlement of 1/600 (1 inch in 50 feet) as compared to the U.S. EPR standard plant analysis results that were based on an initial settlement of 1/1200 (½ inch in 50 feet). Therefore, the site specific departure in differential settlement values is structurally acceptable.

The estimated site-specific differential settlement for the Emergency Power Generating Buildings and Essential Service Water System Cooling Towers (based on a fully flexible basemat) are 1/1166 and 1/845 (approximately ½ inch and ¾ inch in 50 ft), respectively, as stated in FSAR Section 2.5.4.10.2.

As described in Sections FSAR 3.8.5.5.2 and 3.8.5.5.3, finite element analyses were performed for the Emergency Power Generating Buildings and Essential Service Water System Cooling Towers using soil springs representing the CCNPP Unit 3 site. For each structure, the differential settlement within the confines of the building periphery is shown to be substantially less than the 1/1200 (½ inch in 50 feet) requirement of the U.S. EPR FSAR.

The variation of the finite element analysis differential settlement with the estimated differential settlements of Section 2.5.4.10.2 is attributed to the conventional geotechnical treatment of the foundation as a flexible plate, a condition much more conservative than the actual heavily stiffened (by deep reinforced concrete walls) 6'-0" thick reinforced concrete Emergency Power Generating Building and Essential Service Water System Cooling Tower basemats.

Finite element analyses were also performed to evaluate the effects of overall Emergency Power Generating Building and Essential Service Water System Cooling Tower tilts of L/550 and L/600, respectively, where L is the least basemat dimension. For these analyses:

- Spring stiffnesses are adjusted to achieve a tilt of L/550,
- The elliptical distribution of soil springs is maintained,
- Soil spring stiffnesses along the basemat centerline (perpendicular to the direction of tilt) are retained, and
- Adjustment is made to all other springs as a function of the distance from the basemat centerline to the edges.

Bending moments from these finite element analyses confirm that an uncracked condition of the Emergency Power Generating Building and Essential Service Water System Cooling Tower basemats is maintained.

This change associated with the maximum differential settlement of the Nuclear Island common basemat, the Emergency Power Generating Building foundations, and Essential Service Water System Cooling Tower foundations, has been evaluated and determined to not adversely affect the safety function of these structures. Therefore, this change will not result in a significant decrease in the level of safety otherwise provided by the design described in the U.S. EPR FSAR.

The exemption is not inconsistent with the Atomic Energy Act or any other statute. As such, the requested exemption is authorized by law.

This change does not result in a departure from the design and does not require a change in the design described in the U.S. EPR FSAR. In addition, the change has been evaluated and determined to not adversely affect the safety function of the associated structures. Therefore, the requested exemption will not present an undue risk to the public health and safety.

The change does not relate to security and does not otherwise pertain to the common defense and security. Therefore, the requested exemption will not endanger the common defense and security.

The special circumstance necessitating the request for exemption is that the CCNPP Unit 3 Nuclear Island common basemat, the Emergency Power Generating Building foundations, and Essential Service Water System Cooling Tower foundations estimated settlement values exceed the U.S. EPR FSAR value. However, the CCNPP Unit 3 specific maximum differential settlement of the Nuclear Island common basemat, the Emergency Power Generating Building foundations, and Essential Service Water System Cooling Tower foundations, has been evaluated and determined to not adversely affect the safety function of these structures. As such, application of the regulation for this particular circumstance would not serve the underlying purpose of the rule and is not required to achieve the underlying purpose of the rule.

This requested exemption does not require a change in the design described in the U.S. EPR FSAR. Therefore, this exemption will not result in any loss of standardization.

For these reasons, Calvert Cliffs 3 Nuclear Project, LLC, and UniStar Nuclear Operating Services, LLC, request approval of the requested exemption from compliance with the U.S. EPR FSAR Tier 1 and 2 requirements associated with maximum differential settlement.

1.2.2 ACCIDENT ATMOSPHERIC DISPERSION FACTOR (0-2 HOUR, LOW POPULATION ZONE)

Applicable Regulation: 10 CFR Part 52

The U.S. EPR FSAR Tier 1 Table 5.0-1, Tier 2 Table 2.1-1, Tier 2 Section 2.3.4, and Tier 2 Section 15.0.3 identify the 0-2 hour Accident Atmospheric Dispersion Factor (Low Population Zone) of $\leq$ 1.75E-4 sec/m^3. The corresponding CCNPP Unit 3 value is 2.151E-04 sec/m^3, as discussed in CCNPP Unit 3 FSAR Section 2.3.4, Site-Specific EAB/LPZ Accident χ/Q Values for Ground Level Releases.

Pursuant to 10 CFR 52.7 and 10 CFR 52.93, Calvert Cliffs 3 Nuclear Project, LLC, and UniStar Nuclear Operating Services, LLC, request an exemption from compliance with the U.S. EPR FSAR Tier 1 and 2 requirements associated with the 0-2 hour Accident Atmospheric Dispersion Factor (Low Population Zone).

Discussion:

The U.S. EPR FSAR identifies the 0-2 hour Accident Atmospheric Dispersion Factor (Low Population Zone) of $\leq$ 1.75E-4 sec/m^3. The corresponding CCNPP Unit 3 value is 2.151E-04 sec/m^3, as discussed in CCNPP Unit 3 FSAR Section 2.3.4, Site-Specific EAB/LPZ Accident χ/Q Values for Ground Level Releases. This CCNPP Unit 3 specific value exceeds the U.S. EPR FSAR value. As a result, the entire EAB/LPZ of site specific Accident Atmospheric Dispersion Factors, including the Low Population Zone 0-2 hour at 1.5 miles χ/Q of 2.151E-04 sec/m^3, were used to calculate the site-specific doses resulting from the design basis accident scenarios specified in

U.S. EPR FSAR Section 15.0.3. In each case, the resulting Low Population Zone doses (reflected in CCNPP Unit 3 FSAR Chapter 15) were determined to be below the regulatory limits. Therefore, these changes will not result in a significant decrease in the level of safety otherwise provided by the design described in the U.S. EPR FSAR.

The exemption is not inconsistent with the Atomic Energy Act or any other statute. As such, the requested exemption is authorized by law.

This change does not result in a departure from the design and does not require a change in the design described in the U.S. EPR FSAR. In addition, the Low Population Zone doses resulting from the associated CCNPP Unit 3 specific χ/Q values have been determined to be below regulatory limits. Therefore, the requested exemption will not present an undue risk to the public health and safety.

The change does not relate to security and does not otherwise pertain to the common defense and security. Therefore, the requested exemption will not endanger the common defense and security.

The special circumstance necessitating the request for exemption is that the CCNPP Unit 3 specific value for the 0-2 hour Accident Atmospheric Dispersion Factor (Low Population Zone, 1.5 miles) exceeds the U.S. EPR FSAR value. However, the CCNPP Unit 3 specific 0-2 hour Accident Atmospheric Dispersion Factor (Low Population Zone, 1.5 miles), does not result in Low Population Zone doses that exceed regulatory limits. As such, application of the regulation for this particular circumstance would not serve the underlying purpose of the rule and is not required to achieve the underlying purpose of the rule.

This requested exemption does not require a change in the design described in the U.S. EPR FSAR. Therefore, this exemption will not result in any loss of standardization.

For these reasons, Calvert Cliffs 3 Nuclear Project, LLC, and UniStar Nuclear Operating Services, LLC, request approval of the requested exemption from compliance with the U.S. EPR FSAR Tier 1 and 2 requirements associated with the 0-2 hour Accident Atmospheric Dispersion Factor (Low Population Zone, 1.5 miles).

1.2.3 USE OF M5™ ADVANCED ZIRCONIUM ALLOY FUEL ROD CLADDING

Applicable Regulations: 10 CFR 50.46 and 10 CFR 50, Appendix K

Pursuant to 10 CFR 52.7 and 10 CFR 52.93, Calvert Cliffs 3 Nuclear Project, LLC, and UniStar Nuclear Operating Services, LLC, request an exemption from the requirements of 10 CFR 50.46, Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors, and 10 CFR 50, Appendix K, ECCS Evaluation Models, paragraph I.A.5, regarding the use of Zircaloy or ZIRLO as fuel cladding material. This exemption request is related to the proposed use of the M5™ advanced zirconium alloy for the CCNPP Unit 3 fuel rod cladding and fuel assembly structural material.

Discussion:

In accordance with 10 CFR 52.7, the Commission may grant exemptions from requirements of the regulations of 10 CFR 52 and that the NRC consideration is governed by 10 CFR 50.12. 10 CFR 50.12 states that the NRC may grant an exemption provided that: 1) the exemption is authorized by law, 2) the exemption will not present an undue risk to public health and safety, 3) the exemption is consistent with common defense and security, and 4) special circumstances, as defined in 10 CFR 50.12(a)(2) are present. The requested exemption to allow

the use of advanced zirconium alloys other than Zircaloy and ZIRLO for fuel cladding material for CCNPP Unit 3 satisfies these requirements as described below.

The NRC has approved similar exemption requests for other nuclear power plants; in particular, fuel with M5™ cladding is used in several operating plants in the United States.

The fuel that will be irradiated in the CCNPP Unit 3 contains cladding material that does not conform to the cladding material designations explicitly defined in 10 CFR 50.46 and 10 CFR 50, Appendix K. However, the criteria for these sections are satisfied for the CCNPP Unit 3 core containing M5™ fuel rod cladding and fuel assembly structural material. Therefore, the requested exemption is authorized by law.

The M5™ fuel rod cladding and fuel assembly structural material have been evaluated to confirm that the operation of this fuel product does not increase the probability of occurrence or the consequences of an accident. The evaluation also concluded that no new or different type of accident will be created that could pose a risk to public health and safety. In addition, appropriate safety analyses have been performed to demonstrate that this fuel type does not present an undue risk to the public health and safety. NRC approved safety analyses methods are used for the CCNPP Unit 3 core which contains M5™ fuel rod cladding and fuel assembly structural materials.

The M5™ fuel rod cladding is similar in design to the cladding material used in operating plants. The special nuclear material in this fuel product will be handled and controlled in accordance with approved procedures. It has been confirmed through evaluation that M5™ fuel rod cladding and fuel assembly structural material will not endanger the common defense and security.

The special circumstance necessitating the request for exemption to 10 CFR 50.46 and 10 CFR 50, Appendix K is that neither of these regulations allows the use of M5™ fuel rod cladding material. The underlying purpose of 10 CFR 50.46 is to ensure that nuclear power facilities have adequately demonstrated the cooling performance of the Emergency Core Cooling System (ECCS). Topical Report BAW-10227P-A, Evaluation of Advanced Cladding and Structural Material (M5™) in PWR Reactor Fuel, approved by the NRC by letter dated February 4, 2000, demonstrates that the effectiveness of the ECCS will not be affected by a change from Zircaloy fuel rod cladding to M5T^{M} fuel rod cladding.

The underlying purpose of 10 CFR 50, Appendix K, paragraph I.A.5 is to ensure that cladding oxidation and hydrogen generation are appropriately limited during a LOCA and conservatively accounted for in the ECCS evaluation model. Specifically, 10 CFR 50, Appendix K requires that the Baker-Just equation be used in the ECCS evaluation model to determine the rate of energy release, cladding oxidation, and hydrogen generation. Appendix D of BAW-10227P-A demonstrates that the Baker-Just model is conservative in all post-LOCA scenarios with respect to the use of M5™ advanced alloy as a fuel rod cladding material.

Therefore, the intent of 10 CFR 50.46 and 10 CFR 50, Appendix K is satisfied for the planned operation with M5™ fuel rod cladding and fuel assembly structural material. Issuance of an exemption from the criteria of these regulations for the use of M5TM fuel rod cladding and fuel assembly structural material in the CCNPP Unit 3 core will not compromise safe operation of the reactor.

For these reasons, Calvert Cliffs 3 Nuclear Project, LLC, and UniStar Nuclear Operating Services, LLC, request approval of the requested exemption from the 10 CFR 50.46 and 10 CFR 50, Appendix K, requirements regarding the use of Zircaloy or ZIRLO as fuel cladding material.

1.2.4 TOXIC GAS DETECTION AND ISOLATION

Applicable Regulation: 10 CFR Part 52

The U.S. EPR FSAR Tier 1 Section 2.6.1 requires that the main control room air conditioning system maintain habitability of the control room envelope and ambient temperature conditions inside the control room envelope during toxic gas contamination events. As a result, the U.S. EPR design provides a toxic gas alarm signal with automatically closing air intake dampers. For CCNPP Unit 3, the toxic gas alarm signal is not required and protection from toxic gas contamination events is not part of the site-specific design basis.

Pursuant to 10 CFR 52.7 and 10 CFR 52.93, Calvert Cliffs 3 Nuclear Project, LLC, and UniStar Nuclear Operating Services, LLC, request an exemption from compliance with the U.S. EPR FSAR Tier 1 and Tier 2 requirements associated with control room envelope isolation as a result of the toxic gas detection and alarm signal.

Discussion:

The U.S. EPR design includes toxic gas detection and alarm signals to actuate automatic closure of the control room air intake dampers. The evaluation of toxic chemicals hazards in CCNPP Unit 3 FSAR Section 2.2.3 did not identify any credible toxic chemical accidents that exceed the limits established in Regulatory Guide 1.78. The evaluation concluded that no specific provisions are required to protect the operators from an event involving a release of toxic gas. So, toxic gas detection and subsequent control room envelope isolation are neither needed, nor provided for CCNPP Unit 3. Therefore, this change will not result in a significant decrease in the level of safety otherwise provided by the design described in the U.S. EPR FSAR.

The exemption is not inconsistent with the Atomic Energy Act or any other statute. As such, the requested exemption is authorized by law.

The CCNPP Unit 3 design does not require reliance on a toxic gas detection and alarm signal to initiate automatic closure of air intake dampers and isolation of the control room envelope. An evaluation of the CCNPP Unit 3 toxic chemicals in FSAR Section 2.2.3 did not identify any credible toxic chemical accidents that exceeded the limits established in Regulatory Guide 1.78. No new or different type of accident will be created that could pose a risk to public health and safety.

The change does not relate to security and does not otherwise pertain to the common defense and security. Therefore, the requested exemption will not endanger the common defense and security.

The special circumstance necessitating the request for exemption is that it has been demonstrated via analysis that the toxic gas detection and alarm signal to initiate automatic closure of air intake dampers for the main control room envelope is not required, as previously discussed. Therefore, application of the rule is not necessary to achieve the underlying purpose of the rule.

This requested exemption does not require a change in the design described in the U.S. EPR FSAR. This exemption request is based on the site specific toxic hazards evaluation and is requested for CCNPP Unit 3.

For these reasons, Calvert Cliffs Nuclear Project, LLC, and UniStar Nuclear Operating Services, LLC, request approval of the requested exemption from compliance with the U.S. EPR FSAR Tier 1 and 2 requirements associated with toxic gas alarms for the main control room.

1.2.5 Shear Wave Velocity

Applicable Regulation: 10 CFR Part 52

The U.S. EPR FSAR Tier 1 Table 5.0-1, and Tier 2 Table 2.1-1, identifies a minimum shear wave velocity (low strain best estimate average value at bottom of basemat) of 1,000 feet per second (fps).

The best estimate shear wave velocity in Fill layer 2, the fill from 6 feet below grade (the basemat of the Emergency Power Generating Building (EPGBs)) to 22 feet below grade is 900 fps. The best estimate shear wave velocity beneath the Essential Service Water Buildings (ESWBs) is 1080 fps. Calvert Cliffs 3 Nuclear Project, LLC and UniStar Nuclear Operating Services, LLC, are establishing acceptance criteria for shear wave velocity testing that are approximately one standard deviation less than the best estimate values, but greater than the lower bound values used by the site-specific Soil-Structure Interaction (SSI) analysis. Establishing acceptance criteria greater than the lower bound but less than the best estimate value will ensure that the shear wave velocity testing demonstrates that the backfill has been properly graded and installed, while minimizing the potential for a false failure of the shear wave velocity due to small inconsistencies in the field measured data resulting in an average shear wave velocity that is within the bounds of the analysis, but less than the best estimate value from laboratory testing. Calvert Cliffs 3 Nuclear Project, LLC and UniStar Nuclear Operating Services, LLC, have established 630 fps and 720 fps as the acceptance criteria for the EPGBs and ESWBs respectively. Since these values are less than 1,000 fps, this constitutes a departure.

Therefore this U.S. EPR criterion is not met.

Pursuant to 10 CFR 52.7 and 10 CFR 52.93, Calvert Cliffs 3 Nuclear Project, LLC and UniStar Nuclear Operating Services, LLC request an exemption from compliance with the U.S. EPR FSAR Tier 1 and 2 requirements associated with the minimum shear wave velocity.

Discussion:

The U.S. EPR FSAR identifies a minimum shear wave velocity (low strain best estimate average value at bottom of basemat) of 1,000 fps in Tier 1, Table 5.0-1. U.S. EPR FSAR Tier 1 Section 5.0 also states:

> In the case of seismic design parameters, deviations from the defined conditions may be justified by site-specific soil-structure interaction analyses. The results may be used to confirm the seismic design adequacy of the certified design using approved methods and acceptance criteria.

This 1,000 fps requirement, without identifying specific structures, is repeated in Table 2.1-1 of Tier 2. Section 2.5.2.6, *Ground Motion Response Spectrum*, of the U.S. EPR FSAR states that the applicant will confirm that the low-strain, best-estimate, value of shear wave velocity at the

bottom of the foundation basemat of the Nuclear Island (NI) Common Basemat Structures is 1,000 fps, or greater.

U.S. EPR FSAR Section 2.5.4.3, *Foundation Interfaces*, specifies the following requirement with respect to shear wave velocity:

> (4) adequate dynamic properties (i.e., shear wave velocity and strain-dependent modulus-reduction and hysteretic damping properties) to support the Seismic Category I structures of the U.S. EPR under earthquake loading.

The fill selected for CCNPP Unit 3 is competent material. It has a moist unit weight of 145 lb/ft^3 and an angle of internal friction of more than 40°. Both of these values exceed the U.S. EPR established criteria. Shear wave velocity is a function of both the material and the confining pressure of the overlying soils (or structures). Because of the lack of confining pressure, a best estimate shear wave velocity of 1,000 fps or more is unlikely to be obtained immediately below a shallow foundation structure.

The site-specific Soil-Structure Interaction (SSI) analysis performed for FSAR Section 3.7 establishes a range of acceptable shear wave velocities beneath the ESWBs and EPGBs. The lowest acceptable shear wave velocity is a lower bound and the highest is an upper bound. This analysis demonstrates that the EPGBs withstand the safe shutdown earthquake (SSE) for that range of shear wave velocities.

Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) testing will be performed during construction to confirm that the shear wave velocity of the installed and compacted fill exceeds the lower bound shear wave velocity used in the FSAR Section 3.7 analysis. This ITAAC testing demonstrates acceptability of this aspect of the building seismic analysis.

This change associated with the shear wave velocity below the EPGB and ESWB foundations has been evaluated and determined to not adversely affect the safety function of these structures. Therefore, this change will not result in a significant decrease in the level of safety otherwise provided by the design described in the U.S. EPR FSAR.

The exemption is not inconsistent with the Atomic Energy Act or any other statute. As such, the requested exemption is authorized by law.

This change does not result in a departure from the design and does not require a change in the design described in the U.S. EPR FSAR. In addition, the change has been evaluated and determined to not adversely affect the safety function of the associated structures. Therefore, the requested exemption will not present an undue risk to the public health and safety.

The change does not relate to security and does not otherwise pertain to the common defense and security. Therefore, the requested exemption will not endanger the common defense and security.

The special circumstance necessitating the request for exemption is that the fill below the EPGB and ESWB foundations will not meet the minimum shear wave velocity of 1,000 fps identified in the U.S. EPR FSAR. However, the EPGBs and ESWBs have been evaluated using the properties of the existing soil column and the selected fill and the lower shear wave velocity of the fill has been determined to not adversely affect the safety function of these structures. As such, application of the regulation for this particular circumstance would not serve the

underlying purpose of the rule and is not required to achieve the underlying purpose of the rule.

This requested exemption does not require a change in the design described in the U.S. EPR FSAR. Therefore, this exemption will not result in any loss of standardization.

For these reasons, Calvert Cliffs 3 Nuclear Project, LLC and UniStar Nuclear Operating Services, LLC request approval of the requested exemption from compliance with the U.S. EPR FSAR Tier 1 and 2 requirements associated with shear wave velocity.

1.2.6 General Technical Specification and Bases - Setpoint Control Program

Applicable Regulation: 10 CFR Part 52

The U.S. EPR FSAR Tier 2, Chapter 16.0, Technical Specifications and Bases specify setpoints for reactor trip, Engineered Safety Features functions, and Permissives.

Pursuant to 10 CFR 52.7 and 10 CFR 52.93, Calvert Cliffs 3 Nuclear Project, LLC, and UniStar Nuclear Operating Services, LLC, request an exemption from compliance with the U.S. EPR FSAR Technical Specification requirements associated with the setpoints for reactor trip, Engineered Safety Features functions, and Permissives.

Discussion:

Certain plant specific setpoints cannot be determined until after the selection of instrumentation and require as-built system design information, which may not occur until after the approval of the COL application is granted. SECY-08-0142, Change in Staff Position Concerning Information in Plant-Specific Technical Specifications that Combined License Applicants Must Provide to Support Issuance of Combined Licenses," states that "the plant-specific Technical Specifications issued with a combined license must be complete, implementable, and provide a basis for the Commission to conclude that the plant will operate in accordance with the relevant requirements." An option to satisfy this requirement is to relocate numerical values out of the Technical Specifications and replace them with an administrative program that references NRC approved methodologies for determining these values. Appropriate Technical Specifications will reference the Setpoint Control Program and a Setpoint Control Program description will be added to the Administrative Controls - Programs and Manuals Section 5.5. The Setpoint Control Program references the methodologies for determining setpoints that have previously been reviewed and approved by the NRC. Bases descriptions will be revised, as necessary.

The exemption is not inconsistent with the Atomic Energy Act or any other statute. As such, the requested exemption is authorized by law.

As discussed in COLA Part 7, Section 1.1, this change results in a departure from the design as described in the U.S. EPR FSAR. The change has been evaluated and determined to not adversely affect the safety function of the associated structures, systems, components, reactor trip or Engineered Safety Features functions. Therefore, the requested departure and exemption will not present an undue risk to the public health and safety.

The change does not relate to security and does not otherwise pertain to the common defense and security. Therefore, the requested exemption will not endanger the common defense and security.

The special circumstance necessitating the departure and the request for exemption is that the plant specific setpoints cannot be determined until after the selection of instrumentation and require as-built system design information, which may not occur until after the approval of the COL application is granted. The use of NRC approved methodologies will ensure the setpoints contained in, and controlled by, the Setpoint Control Program will not adversely affect the safety functions. As such, application of the regulation for this particular circumstance would not serve the underlying purpose of the rule and is not required to achieve the underlying purpose of the rule.

This requested departure and exemption relates to an administrative controlled program and does not require a physical change in the design described in the U.S. EPR FSAR. Therefore, this departure and exemption will not result in any loss of standardization.

For these reasons, Calvert Cliffs 3 Nuclear Project, LLC, and UniStar Nuclear Operating Services, LLC, request approval of the requested exemption from compliance with the U.S. EPR FSAR Tier 2, Chapter 16.0, Technical Specifications and Bases, which specify setpoints for reactor trip, Engineered Safety Features functions, and Permissives.